

WHAT IS CLAIMED IS:

1. A substrate processing method comprising:
a closing step of placing a substrate in a processing bath and closing the processing bath; and
5 a pressure control step of changing an internal pressure of the processing bath with the substrate dipped in a processing solution,
wherein the pressure control step comprises an evacuation step of evacuating the processing bath.
- 10 2. The method according to claim 1, wherein the pressure control step comprises a pressurization step of pressurizing the processing bath after evacuation in the evacuation step.
3. The method according to claim 2, wherein the pressure control step comprises repeating a cycle including the
15 evacuation step and pressurization step a plurality of number of times.
4. The method according to claim 1, wherein the pressure control step comprises reducing the internal pressure of the processing bath to a pressure lower than the atmospheric
20 pressure, and controlling the internal pressure of the processing bath within a pressure range lower than the atmospheric pressure.
5. The method according to claim 1, wherein a substrate to be processed has a depression, and the pressure control
25 step comprises changing the internal pressure of the processing bath such that an air bubble in the depression is released from the depression.

6. The method according to claim 1, further comprising a protective film formation step of forming a protective film on a processed substrate before the substrate is unloaded from the processing bath.
- 5 7. The method according to claim 6, wherein the protective film is made of pure water.
8. A substrate processing method comprising:
an alcohol supply step of supplying alcohol to a substrate having a depression;
10 a processing solution supply step of supplying a processing solution to the substrate, and allowing the processing solution to enter the depression; and
an evaporation step of evaporating the alcohol and at least a portion of the processing solution in the
15 depression,
wherein a cycle including the alcohol supply step, processing solution supply step, and evaporation step is repetitively performed a plurality of number of times.
9. The method according to claim 8, wherein the alcohol
20 supply step, processing solution supply step, and evaporation step are performed by placing a substrate to be processed in a closed processing bath.
10. The method according to claim 9, further comprising, after the processing solution supply step and before the
25 evaporation step, a discharge step of discharging the processing solution from the processing bath.
11. The method according to claim 8, wherein the processing

solution supply step comprises supplying the processing solution to the processing bath such that a liquid level of the processing solution in the processing bath containing the substrate rises across a surface of the substrate.

5 12. The method according to claim 11, wherein the processing solution supply step comprises supplying the processing solution to the processing bath such that the liquid level of the processing solution rises at a rate of 0.001 to 1.0 m/s.

10 13. The method according to claim 8, wherein the alcohol supply step, processing solution supply step, and evaporation step are performed at a pressure lower than the atmospheric pressure.

14. The method according to claim 9, further comprising
15 a protective film formation step of forming a protective film on a processed substrate before the substrate is unloaded from the processing bath.

15. The method according to claim 14, wherein the protective film is made of pure water.

20 16. A substrate processing apparatus comprising:
a closable processing bath for placing a substrate;
and

a pressure control mechanism for controlling an internal pressure of the processing bath,

25 wherein said pressure control mechanism performs a cycle of evacuating and pressurizing said processing bath at least once while the substrate is dipped in a processing

solution in said processing bath.

17. The apparatus according to claim 16, wherein said pressure control mechanism so operates as to repetitively perform the cycle a plurality of number of times.

5 18. The apparatus according to claim 16, wherein said pressure control mechanism so operates as to reduce the internal pressure of said processing bath to a pressure lower than the atmospheric pressure, and then control the internal pressure of said processing bath within a pressure range
10 lower than the atmospheric pressure.

19. The apparatus according to claim 16, wherein said pressure control mechanism so operates as to control the internal pressure of said processing bath such that an air bubble in a depression of a substrate is released from the
15 depression.

20. A substrate processing apparatus comprising:
a closable processing bath for placing a substrate having a depression;
an alcohol supply mechanism for supplying alcohol to
20 the substrate in said processing bath;
a processing solution supply mechanism for supplying a processing solution to the substrate in said processing bath;
a discharge mechanism for discharging the processing
25 solution in said processing bath to outside said processing bath; and
a pressure control mechanism for evacuating said

processing bath to evaporate the alcohol and at least a portion of the processing solution in the depression,

wherein said alcohol supply mechanism, processing solution supply mechanism, discharge mechanism, and
5 pressure control mechanism so operate as to repeat a plurality of number of times a cycle including supply of the alcohol by said alcohol supply mechanism, supply of the processing solution by said processing solution supply mechanism, discharge of the processing solution by said
10 discharge mechanism, and evacuation by said pressure control mechanism.

21. The apparatus according to claim 20, wherein said processing solution supply mechanism supplies the processing solution to said processing bath such that a
15 liquid level of the processing solution in said processing bath rises across a surface of the substrate.

22. The apparatus according to claim 21, wherein said processing solution supply mechanism supplies the processing solution to said processing bath such that the
20 liquid level of the processing solution rises at a rate of 0.001 to 1.0 m/s.